Astrophysics

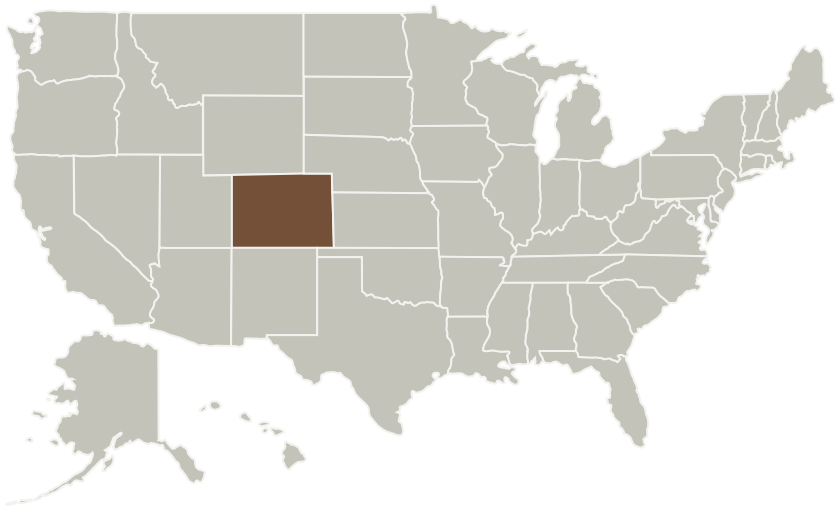
The Ultraviolet Spectra of AGN: Intrinsic Properties and Intervening Material

Completed Technology Project (2016 - 2017)

Project Introduction

I propose to use ultraviolet spectra of active galactic nuclei (AGN) to study both the structure of AGN themselves as well as the intergalactic medium (IGM), which is seen as intervening absorption in the AGN spectra. This proposal outlines an integrative approach to these two topics because careful modeling of either one is required to properly interpret the spectral features of the other. Using data from the Cosmic Origins Spectrograph on board the Hubble Space Telescope in conjunction with archival data from other missions, I will address several open questions with this research. The program has already delivered a number of results concerning the content of the IGM and its relationship to metal production and the metagalactic background. This program will construct a catalog of intrinsic AGN absorbers and correlate them with host AGN properties to help understand how the outflows that they trace arise. Building on my recent work characterizing rest-frame AGN spectra down to 400 A, I will begin analysis of new EUV data for two z~3 quasars with implications for He II reionization. Additionally, through careful characterization of broad AGN emission lines, I will address the problematic issue of single-epoch estimation of supermassive black hole masses. This work will also allow a careful accounting of how host AGN properties affect their broad line spectra, which will help place these objects in context with AGN unification models. Each of these topics represents a major and direct contribution to the objectives of Sub-goal 2.4 of NASA's Strategic Plan, which argues for the need to understand evolution of the universe, its galaxies, and its black holes.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Science Mission Directorate (SMD)

Responsible Program:

Astrophysics

Project Management

Program Manager:

Joe Hill-kittle

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Organizations Performing Work	Role	Type	Location
University of Colorado Boulder	Supporting Organization	Academia	Boulder, Colorado

Primary U.S. Work Locations
Colorado

Project Management *(cont.)*

Principal Investigator:

Michael Shull

Co-Investigators:

Jessica A Maass
Evan M Tilton

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.4 Information Processing
    - TX11.4.3 Semantic Technologies

Target Destination

Outside the Solar System